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10/753,604	01/08/2004	Steffen F. Schulze	115747-0003//2002P50544US	6349

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SLATER & MATSIL LLP  
17950 PRESTON ROAD  
SUITE 1000  
DALLAS, TX 75252

EXAMINER

ROSASCO, STEPHEN D

ART UNIT

PAPER NUMBER

1756

DATE MAILED: 05/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/753,604

Applicant(s)

SCHULZE ET AL.

Examiner

Stephen Rosasco

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 11 March 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,3-10,13-28,32,35,36,39,40,42-44,46 and 47 is/are pending in the application.
- 4a) Of the above claim(s) 19-28 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-10,13-18,32,35,36,39,40,42-44,46 and 47 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

**Detailed Action**

In response to the Amendment of 3/8/06 the examiner withdraws the previous office action rejections and includes new rejections here that were necessitated by amendment. The action is made final.

The disclosure is objected to because of the following informalities: claim 32, lines 13-16 should be the same as the corresponding paragraph from claim 1. Claim 32 line 13, "index of equation", should be -index of refraction-; and need -shift- after "phase".

Appropriate correction is required.

Remarks – The applicant has amended the claims to include the limitation of modifying the thickness of the substrate or first layer. The dependence of thickness and index of refraction on the phase shift is well known and the use of various ways to modify a mask that has a defect in a layer by adjusting the thickness or index of refraction in a defective region of the mask is also known.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee

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pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action.

In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 3-10, 13-28, 32, 35, 36, 39, 40, 42-44, 46 and 47 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Yan (6,562,522) or Miyatake (5,468,337).

These references both teach the depositing of a layer or material that has the same index of refraction of the material that it is deposited on and the removal of a region in a layer to achieve the appropriate thickness, in order to give the desired phase shift.

Yan teaches (see claims) a process for fabricating a photomask, comprising: depositing a first film on top of a substrate, said first film having a first thickness of a particular material; depositing a second film on top of said first film, said second film having a second thickness of another material; patterning a resist to form a resist pattern; etching said second film according to said resist pattern to form a film pattern, and removing said resist; and etching said first film according to said film pattern, where said first and second thicknesses are configured to provide specified attenuation and phase shift, wherein both the particular material and the another material modify the attenuation and

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phase shift; and choosing said first and second thicknesses, represented by d.sub.1 and d.sub.2 respectively, according to the disclosed equations.

And further comprising: inspecting said film pattern after etching said second film for leftover defects; and removing and filling said leftover defects using said first film as an etch stop buffer layer.

Miyatake teaches (see claims) a method of mending a black defect area in a mask which has a phase shift pattern which is comprised of a light shielding film of first pattern formed on a mask substrate and a phase shifter of a second pattern formed on uncovered surface of said mask substrate, said black defect area being made of said phase shifter and located in a surface of said mask substrate where it is not supposed to be, comprising:

a first step of forming a mending phase shifter entirely on said mask substrate which is made of material in such a manner that said mending phase shifter is  $2 (+1/18)$  times as thick as said phase shifter, said mending phase shifter being made of material which has the same refractive index as that of said phase shifter and has a flat surface;

a second step of forming a resist on said mending phase shifter at an area which corresponds to said black defect area; and

a third step of etching said mending phase shifter through said resist leaving a permanently formed portion of said mending phase shifter which phase shifts  $(+/-10\text{ degree})$  light passing there through at an integer multiple of 360 degree.

Miyatake also teaches a method of mending white defect area in a mask which has a phase shift pattern which is comprised of a light shielding film of a predetermined pattern formed on a mask substrate and phase shifter of a predetermined pattern formed on an

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uncovered surface of said mask substrate, said white defect area being defined as a partially lacked portion of said phase shifter, comprising:

a first step of forming a mending phase shifter entirely on said mask substrate and setting the thickness of said mending phase shifter from said surface of said mask substrate as  $3 (+/- 1/18)$  times as thick as said phase shifter, said mending phase shifter being made of material which has the same refractive index as that of said phase shifter;

a second step of forming a resist on said mending phase shifter at an area which corresponds to said white defect area; and

a third step of etching said mending phase shifter through said resist leaving a permanently formed portion of said mending phase shifter which phase shifts  $(+/- 10)$  degree light passing therethrough at an integer multiple of 360 degree.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Stephen Rosasco whose telephone number is (571) 272-1389. The Examiner can normally be reached Monday-Friday, from 8:00 AM to 4:30 PM. The Examiner's supervisor, Mark Huff, can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



S. Rosasco  
Primary Examiner  
Art Unit 1756

S. Rosasco  
5/12/06